

PROCEEDINGS
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BRIEF SYNOPSIS OF THE WATERRATS OF EUROPE.

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The following brief synopsis of the European members of the genus *Arvicola* is primarily based on studies made in the British Museum during the summer of 1908.

GENUS ARVICOLA Lacépède.

***Arvicola amphibius* (Linnaeus).**

Size large (head and body about 200 mm., tail about 110 mm., hind foot usually 30 to 34 mm., condylobasal length of fully adult skulls 40 to 44.6 mm.); tail somewhat more than half as long as head and body; color above dark brown, blackening along back, the sides not decidedly yellowish, the cheeks not contrasted with surrounding parts; skull not fossorial in form, the occiput and rostrum tending to be squarely (vertically) truncate, the upper incisors not conspicuously projecting; *nasals* at widest region conspicuously narrower than rostrum; roots of m_1 and m_2 forming evident protuberances on lower surface of mandible in old individuals; habits strictly aquatic, never mole-like. Confined to Great Britain.

***Arvicola amphibius amphibius* (Linnaeus).**

1758. [*Mus*] *amphibius* Linnaeus, Syst. Nat., I, 10th ed., p. 61 (England: based on the *Mus major aquaticus* of Ray).

Size maximum for the species (hind foot in adults usually 32 to 35 mm.; condylobasal length of skull 42 mm. or more); color moderately dark, the black rarely in excess of brown on upperparts; melanism infrequent. England and southern Scotland.

***Arvicola amphibius reta* nom. nov.**

1832. *Arvicola ater* Macgillivray, Mem. Wernerian Soc. Nat. Hist., VI, p. 429. (Aberdeen, Scotland). Not *Hypudæus terrestris* β *ater* Billberg, 1827, a synonym of *Arvicola terrestris*.

Size less than in *A. amphibius amphibius* (hind foot usually 30 to 32 mm., condylobasal length of skull usually less than 42 mm.); normal

color darker than in the typical race, the black usually in excess on upperparts; melanism frequent. Central and northern Scotland.

***Arvicola sapidus* Miller.**

Like *Arvicola amphibius* but nasal bones much widened anteriorly, their greatest combined breadth nearly equal to that of rostrum; habits aquatic. Iberian Peninsula and southern France, east nearly to the Italian border; northern limits of range not known.

***Arvicola sapidus sapidus* Miller.**

1908. *Arvicola sapidus* Miller, Ann. and Mag. Nat. Hist., 8th ser., I, p.

195. February, 1908. (Santo Domingo de Silos, Burgos, Spain).

Color not so dark as in *A. amphibius amphibius*, the sides and face a clear yellowish brown without noticeable sprinkling of blackish hairs. Essentially the entire Iberian Peninsula; lowlands of southern France east of the Pyrenees. French specimens not perfectly typical.

***Arvicola sapidus tenebricus* (Miller).**

1908. *Arvicola tenebricus* Miller, Ann. and Mag. Nat. Hist., 8th ser., I,

p. 196. February, 1908 (Biarritz, Basses-Pyrénées, France).

Color essentially as in *A. amphibius amphibius*, the sides and face conspicuously sprinkled with blackish hairs. Pyrenees and Atlantic coast of southwestern France, north to the Garonne; northern limits of range not known.

***Arvicola terrestris* (Linnaeus).**

1758. [*Mus*] *terrestris* Linnaeus, Syst. Nat., I, 10th ed., p. 61 (Upsala, Sweden).

Size less than in *A. amphibius* (head and body about 175 mm., tail about 100 mm., hind foot usually 28 to 31 mm., condylobasal length of adult skulls 36 to 39 mm.); color dark, essentially as in *A. amphibius reta*, but cheeks usually more yellowish than surrounding parts; skull slightly but evidently fossorial in form, the rostrum and occiput tending to be obliquely truncate, the upper incisors projecting noticeably forward; interparietal tending to be subquadrate in outline; teeth rather heavy, but roots of m_1 and m_2 not forming protuberances on lower surface of mandible; habits both aquatic and mole-like. Scandinavian Peninsula, eastward into Russia; limits of range not known.

***Arvicola italicus* (Savi).**

1839. *Arvicola amphibius* var. *italica* Savi, N. Giorn. de' Letterati, XXXVII, No. 102, p. 202 (p. 5 of separate), February, 1839 (Pisa, Italy).

Similar to *Arvicola terrestris*, but teeth not so heavy and color not so dark, the underparts washed with yellowish brown instead of rusty; the cheeks not contrasting noticeably with surrounding parts. Italian Switzerland and northern Italy, south at least to the vicinity of Pisa.

Arvicola illyricus (Barrett-Hamilton).

1899. *Microtus musignani illyricus* Barrett-Hamilton, Ann. and Mag. Nat. Hist., 7th ser., III, p. 225. March, 1899 (Bosnia, no exact locality).

Like *Arvicola italicus* but underparts with a decided whitish wash. Bosnia.

Arvicola musignani de Selys-Longchamps.

1839. *Arvicola musignani* de Selys-Longchamps, Revue Zoologique, p. 8, January, 1839. (Rome, Italy).

Size and general characters as in *Arvicola italicus*, but color pale and yellowish, like that of *A. sapidus sapidus*. Central Italy, at present known from the west coast only.

Arvicola scherman (Shaw).

Essentially as in *Arvicola terrestris* but more modified for fossorial life, some of the races having become completely terrestrial; palmar and plantar tubercles reduced, occupying less than half surface of region in which they occur; skull distinctly fossorial in form, the incisors strongly protruding; interparietal tending to be narrow and ligulate in outline. West-central continental Europe from the Pyrenees and Alps to the Baltic; eastern limits of range not known.

Arvicola scherman scherman (Shaw).

1801. *Mus scherman* Shaw, Gen. Zool., II, pt. I, p. 75 (Strassburg, Germany).

Palmar and plantar tubercles relatively smaller than in *Arvicola terrestris*, though not so much reduced as in the strictly terrestrial forms; length of hind foot about 26.5 mm.; condylobasal length of fully adult skulls 35.6 to 36.4 mm.; color of upperparts dark brown usually much clouded with black; tail usually dark brown throughout; habits both aquatic and mole-like. Continental Europe from the Baltic south into Belgium and to southern Germany; limits of range imperfectly known.

Arvicola scherman exitus subsp. nov.

Type, adult female (skin and skull) in British Museum (not registered), St. Gallen, Switzerland, April 28, 1900. E. Zollikofer.

Palmar and plantar tubercles much reduced, occupying distinctly less than half area in which they occur; length of hind foot 22 to 25 mm.; condylobasal length of fully adult skulls 33 to 35 mm.; color of upperparts a light yellowish brown usually without much black clouding; tail buffy throughout or evidently bicolor (never uniformly blackish); auricular bullae not highly inflated, their surface often irregularly flattened; anterior loop of m_1 short and wide; habits strictly terrestrial, mole-like. Alps (not known from the Italian side) at moderate altitudes, and immediately

adjoining lowlands of Switzerland and France; eastward into Tirol; limits of range not known. Measurements of type: head and body, 138; tail, 64; hind foot, 24; ear, 13; skull: condylobasal length, 338.

Arvicola scherman monticola (de Sélvs-Longchamps).

1838. *Arvicola monticola* de Sélvs-Longchamps, *Revue Zoologique*, p. 249 (Pyrenees).

Like *Arvicola scherman exitus* but audital bullæ usually larger and more evenly inflated, and first lower molar with anterior loop longer and narrower than in the Alpine form; habits strictly terrestrial, mole-like. Pyrenees and their immediate neighborhood (known at present from the French side only); a related and perhaps identical animal occurs in the Puy-de-Dôme region.